

CLAIMS

What is claimed is:

1 1. An imaging apparatus comprising:
2 an image sensor including:
3 a plurality of color sensor arrays individually comprising a plurality
4 of sensors configured to provide image data for a plurality of pixels of a
5 respective color component at an initial resolution; and
6 wherein the plurality of color sensor arrays overlap and are offset
7 with respect to one another to define a plurality of sub-pixels for individual ones
8 of the pixels; and
9 processing circuitry configured to access the image data for at least one
10 pixel from each of the plurality of color sensor arrays, and using the accessed
11 image data, to determine sub-pixel image data for the respective sub-pixels to
12 form an image of an increased resolution compared with the initial resolution of
13 the color sensor arrays.

1 2. The imaging apparatus of claim 1, wherein the arrays comprise a
2 plurality of photodetectors at individual pixels to detect respective color
3 components of light.

1 3. The imaging apparatus of claim 1, wherein each of the sub-pixels
2 comprise red, green, and blue color components, and the plurality of color
3 sensor arrays comprise red, blue, and green color sensor arrays.

1 4. The imaging apparatus of claim 3, wherein overlapping of the red,
2 green, and blue color sensor arrays enables determination of the image data at
3 an increased number of physical locations within the individual ones of the pixels
4 to create an image of a higher resolution at a sub-pixel level.

1 5. The imaging apparatus of claim 1, wherein the increased resolution
2 image is created by determining sub-pixel image data for individual pixels using
3 the image data from each of the plurality of color sensor arrays.

1 6. The imaging apparatus of claim 1, wherein the offsetting of the color
2 sensor arrays is performed by physically shifting the plurality of color sensor
3 arrays in a desired direction.

1 7. The imaging apparatus of claim 1, wherein the offsetting of the color
2 sensor arrays is performed by using an optical device.

1 8. The imaging apparatus of claim 7, wherein the optical device is a
2 prism.

1 9. The imaging apparatus of claim 7, wherein the optical device is a lens.

1 10. An imaging apparatus comprising:
2 an image sensing means including:

3 a plurality of color sensor arrays, individual sensor arrays
4 comprising a plurality of sensor means for providing image data for a plurality of
5 pixels of a respective color component at an initial resolution;

6 wherein individual ones of the sensor means are arranged in a
7 layered stack for individually detecting red, green, and blue components of light,
8 respectively;

9 wherein the plurality of sensor means of respective color sensor
10 arrays are arranged in an offset relationship with respect to one another for
11 defining a plurality of sub-pixels for individual ones of the pixels; and

12 processing means for accessing the image data for at least one pixel from
13 each of the plurality of color sensor arrays, and using the accessed image data,
14 to form an image of an increased resolution compared with the initial resolution
15 of the color sensor arrays.

1 11. The imaging apparatus of claim 10, wherein the offset is achieved by
2 physically shifting layers of the sensor means.

1 12. The imaging apparatus of claim 10, wherein the offset is achieved by
2 using an optical device.

1 13. The imaging apparatus of claim 12, wherein the optical device is a
2 prism.

1 14. The imaging apparatus of claim 12, wherein the optical device is a
2 lens.

1 15. The imaging apparatus of claim 10, wherein the sensor means are
2 offset in a depthwise direction with respect to a direction of received light.

1 16. The imaging apparatus of claim 10, wherein the processing means
2 comprises means for determining the sub-pixel image data for the respective
3 sub-pixels of an individual pixel using the accessed image data of the respective
4 individual pixel, and the processing means further comprises means for forming
5 an image of the increased resolution.

1 17. An image data processing method comprising:
2 providing image data using an image sensor, and the providing
3 comprising:
4 configuring a plurality of color sensor arrays to overlap one another
5 in an offset relationship to define a plurality of sub-pixels for individual ones of a
6 plurality of pixels, wherein individual color sensor arrays comprise a plurality of
7 sensor elements configured to provide the image data for the plurality of pixels
8 of a respective color component at an initial resolution;
9 accessing the image data for at least one pixel from each of the
10 plurality of color sensor arrays; and
11 forming an image having an increased resolution compared with the initial
12 resolution of the color sensor arrays using the accessed image data.

1 18. The method of claim 17, wherein the forming comprises:
2 determining sub-pixel image data from the accessed image data, and
3 using the sub-pixel image data to form the image having increased resolution.

1 19. The method of claim 17, wherein the image having increased
2 resolution is formed at a sub-pixel level.

1 20. The method of claim 17, wherein the offset is performed by using an
2 optical device.

1 21. The method of claim 20, wherein the optical device is a prism.

1 22. The method of claim 20, wherein the optical device is a lens.

1 23. The method of claim 17, wherein the offset is achieved by physically
2 shifting sensor elements of individual ones of color sensor arrays at individual
3 pixel locations of the color sensor arrays.

1 24. An image projection method, comprising:
2 receiving an image having a first resolution;
3 splitting the image into a plurality of spectral bands;
4 spatially downsampling each spectral band independently and with a
5 spatial offset; and
6 displaying the spatially downsampled image with an inverse spatial offset
7 of each spectral band.

1 25. The method of claim 24, wherein the displaying comprises projecting
2 the image through a prism.

1 26. The method of claim 24, wherein the spectral bands comprise red,
2 green, and blue color components.

1 27. An article of manufacture comprising:
2 a processor-usable medium comprising processor-usable code
3 configured to cause processing circuitry to:
4 access image data for at least one pixel from each of a plurality of
5 color sensor arrays at an initial resolution; and

6 form an image of increased resolution, compared with the initial
7 resolution of individual ones of the color sensor arrays, using the accessed
8 image data, wherein the color sensor arrays are offset with respect to one
9 another providing a plurality of image data values for at least one color
10 component for a single pixel location.